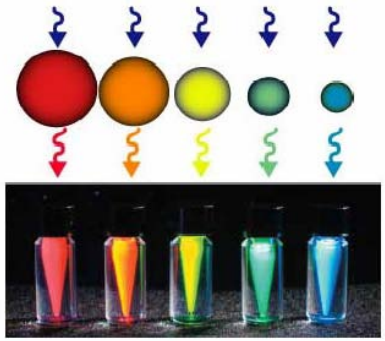
Bioimaging Applications of Modern Nanoparticle Constructions

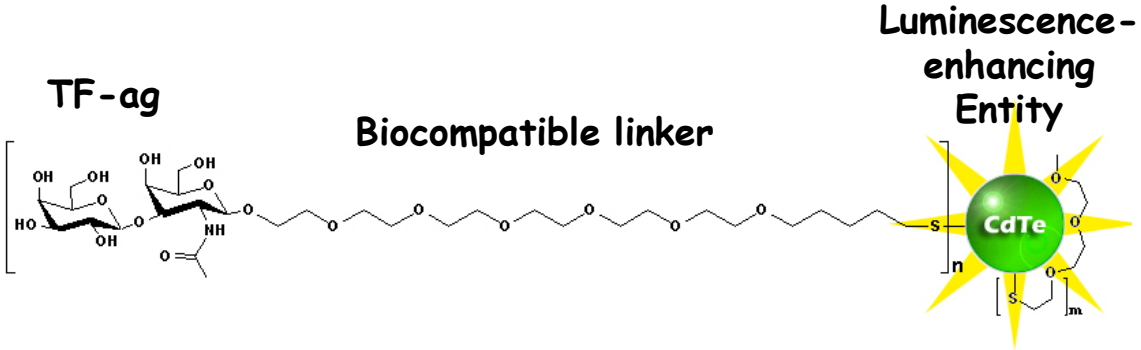
Joseph J Barchi, Jr., Ph.D.

Laboratory of Medicinal Chemistry
National Cancer Institute
National Institutes of Health

Beyond Standard Organic Dyes

- Accurate imaging of diseased cells (e.g., primary and metastatic tumors) is of primary importance in disease management.
- Carbohydrate-encapsulated quantum dots (Qdots) for use in medical imaging.
  - Organic Dyes easily photobleach; qdots are bright, persist, resist photobleaching
  - Certain carbohydrates, especially those included on tumor glycoproteins are known to have affinity for certain cell types
  - Relevant to Medical Imaging, Detecting Relevant Carbohydrate and Macromolecule Interactions.

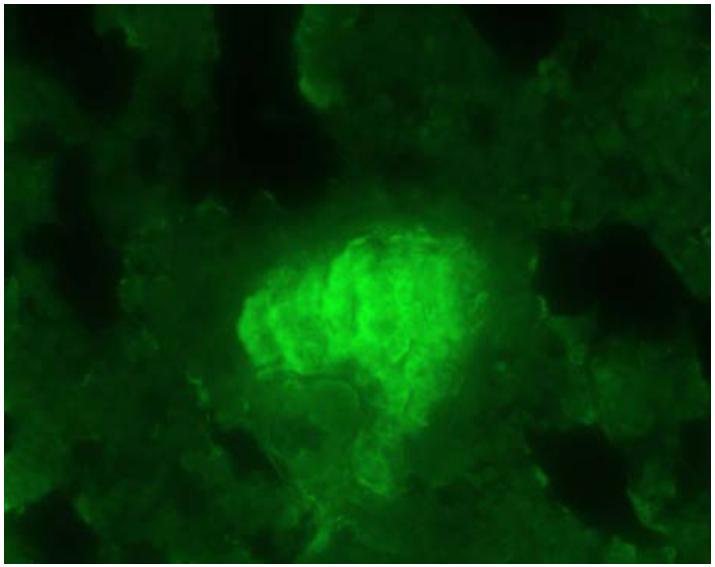




Technology/Commercial Applications

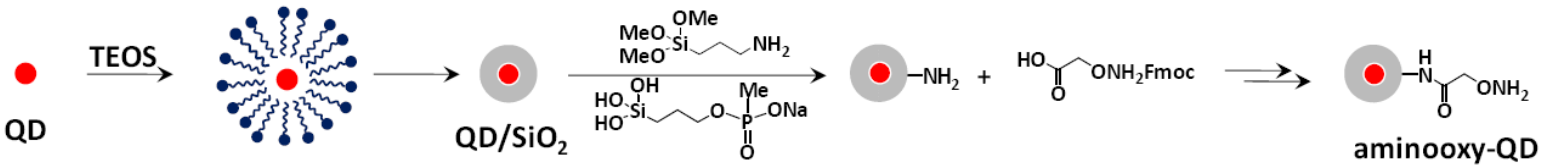
- **Application Areas**
  - Replacement for standard organic dyes for cellular imaging; qdots with proper chemistry can enter cells, dynamic imaging
  - Detection probe for microarrays

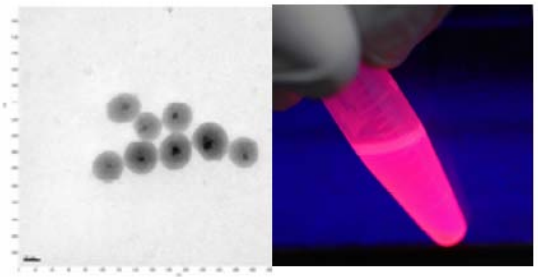
- **Value**
  - Our technology yields stable Qdots with a much reduced molecular weight compared with commercial products
  - Ease of Synthesis
  - Size control, multiplexing (different colors with different chemistries, label separate entities)

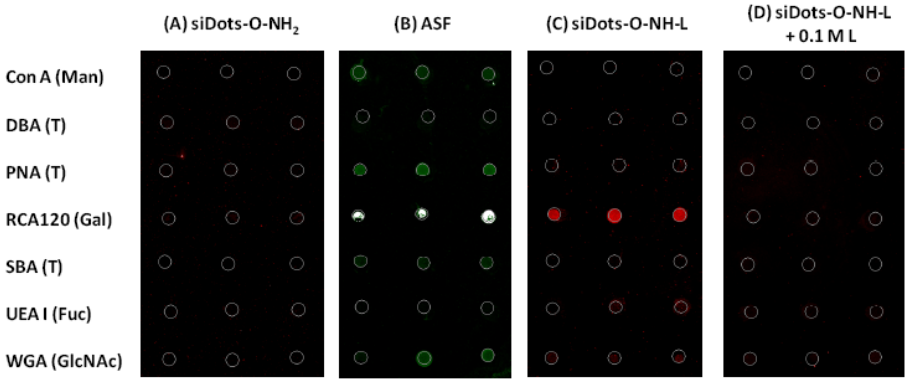


Validation

- Small set of labeling experiments
- Reproducible synthesis and ease of use
- Patent Application US App. #10/578,405 filed 05/05/2006







Collaboration Opportunities

- Collaboration opportunities
  - Develop synthetic methods to use less toxic materials; test stability in vivo; employ wide range of tumor relevant carbohydrates
  - Additional personnel for help with biological/*in vivo* work

- Interested in Collaboration with Researchers (particularly for *in vivo* work)

Contact Information

- For further information contact:
  - Licensing:

    Michael Shmilovich
    NIH Office of Technology Transfer
    (301) 435-5019
    shmilovichm@od.nih.gov

  - Collaboration:

    Michael Currens, Ph.D.
    NCI Technology Transfer Center
    (301) 846-1831
    currens@mail.nih.gov